

NOAA TECHNICAL MEMORANDUM NWS ER-78



NATIONAL WEATHER SERVICE PHILADELPHIA FORECAST OFFICE
1987 NOAA WEATHER RADIO SURVEY & QUESTIONNAIRE

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Eastern Region Headquarters
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**U.S. DEPARTMENT OF
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National Oceanic and
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National Weather
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NOAA TECHNICAL MEMORANDA
National Weather Service, Eastern Region Subseries

The National Weather Service Eastern Region (ER) Subseries provides an informal medium for the documentation and quick dissemination of results not appropriate, or not yet ready for formal publications. The series is used to report on work in progress, to describe technical procedures and practices, or to relate progress to a limited audience. These Technical Memoranda will report on investigations devoted primarily to regional and local problems of interest mainly to ER personnel, and hence will not be widely distributed.

Papers 1 to 22 are in the former series, ESSA Technical Memoranda, Eastern Region Technical Memoranda (ERTM); papers 23 to 37 are in the former series, ESSA Technical Memoranda, Weather Bureau Technical Memoranda (WBTM). Beginning with 38, the papers are now part of the series, NOAA Technical Memoranda NWS.

Papers 1 to 22 are available from the National Weather Service Eastern Region, Scientific Services Division, 585 Stewart Avenue, Garden City, N.Y. 11530. Beginning with 23, the papers are available from the National Technical Information Service, U.S. Department of Commerce, Sillis Bldg., 5285 Port Royal Road, Springfield, Va. 22151. Prices vary for paper copy, \$2.25 microfiche. Order by accession number shown in parentheses at end of each entry.

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NATIONAL WEATHER SERVICE
PHILADELPHIA FORECAST OFFICE
1987

NOAA WEATHER RADIO
SURVEY & QUESTIONNAIRE

prepared by Robert P. Wanton
NOAA Weather Radio Program Director
WSFO Philadelphia, PA

Early in 1987 it was decided that instead of just running a NWR Listener Survey, we would ask our listeners to participate in filling out a questionnaire. The questionnaire pertained to weather terminology, weather and weather related events, NOAA Weather Radio(the Philadelphia broadcast in particular), etc.

The following messages were aired on KIH-28 from 4/9/87 through 7/29/87. They were included with the ID and cycled, approximately, 3 times an hour.....

4/9/87 through 4/29/87

We are currently conducting a Listener Survey. In an effort to improve our broadcasts, we would like to send you a short questionnaire. Upon receipt of the completed questionnaire, and in appreciation for your time and effort, we will then send you a broadcast schedule, several weather brochures, and a NOAA sticker.

To receive your questionnaire, send your name and address on a postcard to:

Question 87
National Weather Service
Federal Building, Room 9258
600 Arch Street
Philadelphia, PA 19106

If you do not want a questionnaire, but would like a broadcast schedule, please enclose a stamped self-addressed envelope and send to:

Schedule
National Weather Service
Federal Building, Room 9258
600 Arch Street
Philadelphia, PA 19106

4/29/87 through 5/8/87

We would like to thank everyone who has responded to our Listener Survey. We have literally been inundated with requests for the questionnaire. If you have mailed for but not yet received your questionnaire, or have sent in your completed questionnaire and have not received your schedule... brochures...and sticker, please be patient. They will be forthcoming in the near future.

For those of you who have not yet requested a questionnaire... it's not too late. The survey will run through Friday May 8.

To receive your questionnaire, send your name and address on a postcard to:

Question 87
National Weather Service
Federal Building, Room 9258
600 Arch Street
Philadelphia, PA 19106

5/8/87 through 6/26/87

Our Listener Survey is now over and we would like to thank everyone who responded. We have been totally overwhelmed with requests for the questionnaire. If you have mailed for but have not yet received your questionnaire, or have sent in your completed questionnaire and have not received your schedule...brochures...and sticker, please be patient. They will be forthcoming in the near future.

Once again thanks to all of you who participated.

6/26/87 through 7/29/87

For those of you who participated in "Question 87", our questionnaire mailing has been completed. If you have sent in your questionnaire, but have not received your brochure package, please be patient and allow up to 10 weeks for delivery.

The questionnaire request brought 2901 responses. Each one was sent a questionnaire (see attached). Following receipt of the completed questionnaire, the participant was mailed a brochure package which included information on thunderstorms, lightning, tornadoes, flash floods, hurricanes, winter storms, and NOAA Weather Radio. It also included a cover letter (see attached), a PHL KIH-28 NWR schedule, and a NOAA sticker. 2677 completed questionnaires were received (92.3% of those mailed) from 4/22/87 through 7/29/87.

Following are some tabulated results from the questionnaire:

#1) Responses by state.....

Pennsylvania	1542	(57.6%)
New Jersey	925	(34.6%)
Delaware	190	(7.1%)
other	20	(0.7%)

Results: The high Pennsylvania percentage is due to the extremely large population in and around the city of Philadelphia, and to the fact that the transmitter tower is located 10 miles northwest of the Delaware River (the Pennsylvania-New Jersey border).

#2) What percentage of the time do you find reception of NOAA Weather Radio to be satisfactory?

% category	# of responses	% of responses
a) <40%	57	2.1%
b) 40-70%	266	9.9%
c) 70-90%	777	29.0%
d) >90%	1577	58.9%

Some of the factors which influence signal reception are:

- 1) direction and distance from the transmitter
- 2) technical transmitter difficulties (low power and/or off-air time)
- 3) routine maintainance (off-air time)
- 4) atmospheric conditions
- 5) receiver and/or antenna quality

Results: Considering the above factors, a large number of listeners (88%) found the reception to be satisfactory greater than 70% of the time. Since low power and off-air time were extremely small, the most important factor seemed to be the direction and distance from the transmitter.

Conclusions: No reason to make any dramatic changes at this time. If there were dead air reception areas, we would have to realign our antenna, but none were evident.

Following is a table of listener distance from the transmitter site:

distance from site	# of listeners	% of listeners
<10 mi	748	27.9%
10-20 mi	800	29.9%
20-30 mi	663	24.8%
30-40 mi	271	10.1%
>40 mi	195	7.3%

#3) What times of the day do you normally listen to NWR?
(more than one answer may apply)

time	# of responses	% of responses
a) 2AM to 5AM	153	5.7%
b) 5AM to 8AM	1861	69.5%
c) 8AM to 11AM	927	34.6%
d) 11AM to 2PM	560	20.9%
e) 2PM to 5PM	573	21.4%
f) 5PM to 8PM	1205	45.0%
g) 8PM to 11PM	1473	55.0%
h) 11PM to 2AM	405	15.1%

Results: The average individual listens shortly after rising in the morning and again before going to bed at night. Almost 70% of our listeners tune in between 5AM and 8AM to get the weather information needed to plan their day. 55% listen between 8PM and 11PM. Most of these are trying to determine what the weather will be the next day. Another time period of high listener interest is 5PM to 8PM (45%). This is probably a combination of students and adults arriving home from school and work, and the fact that our new forecast, which covers a 48 hour period, is normally on the air by 4PM. The least listened to time slot (<6%) is an obvious one 2AM to 5AM when most people are sleeping.

Conclusions: Most of our forecast products are on the air when the majority of our listeners want and need them.

Recommendations: Since our second highest listening time slot is 8PM to 11PM, it is recommended that our evening specialty tapes (climate, agriculture, vacation area, and travelers) remain on the air until 11PM instead of the current 9PM.

#4) Are you satisfied with the content of the broadcast?

choices	# of responses	% of responses
yes	2576	96.2%
no	101	3.8%

Results: While there was a fairly large percentage of listeners (10%) requesting to add products to our broadcast and a much smaller percentage (<2%) wanting to delete products, the great majority of listeners (96.2%) was satisfied with the content of the broadcast.

Conclusions: Our broadcast format, on the whole, was very well received. Naturally, there were some changes requested by specialty users to suit their individual needs. These requests will be handled on an individual basis.

Recommendations: The major portion of our broadcast format will remain unchanged. The recommendation in #3 is pending and several other changes are under consideration.

#6) Which products broadcast on NOAA Weather Radio do you personally use the most? (list in numerical order from 1 to 8).

The following table shows our listeners responses:

	1	2	3	4	5	6	7	8
Synopsis/ area fcst	1565	353	181	124	47	32	17	9
Extended fcst	62	987	696	318	149	51	19	20
Hourly updates	394	561	564	331	193	124	64	20
Climate info	93	161	213	530	300	346	254	113
Travelers/ vacation fcst	17	59	218	419	542	485	346	119
Weather lore	5	38	122	241	529	536	365	358
Marine fcst	166	116	143	173	160	276	476	634
Agricultural fcst	38	64	90	128	186	276	536	798

Results: Some odd numbers of answers are due to the fact that not everyone answered every question. Some people only put their top choices (not all 8) and others put check marks to indicate their preferred choices. From the above table we can list the products most used by our listening audience.....

- 1) Synopsis/area forecast
- 2) Extended forecast
- 3) Hourly updates
- 4) Climate info
- 5) Travelers/vacation area forecast
- 6) Weather lore
- 7) Marine forecast
- 8) Agricultural forecast

Conclusions: The products most people are interested in are the ones which affect all individuals. The special user group forecasts (marine and agriculture) pertain to a much smaller percentage of the listening audience.

Recommendations: The broadcast format should continue to be weighted toward products which can be used by the majority of the people. Special user group forecasts are needed, but, depending on the forecast, should have more specific and limited air time.

The next two questions were aimed at determining whether or not our listeners knew the meaning of the terms "Severe Thunderstorm Watch" and "Severe Thunderstorm Warning".

#7) If a "Severe Thunderstorm Watch" is broadcast for your area, what does it mean to you?

choices	# of responses	% of responses
a) a severe thunderstorm is imminent or occurring	194	7.2%
b) a severe thunderstorm is possible	2483	92.8%

#8) If a "Severe Thunderstorm Warning" is broadcast for your area, what does it mean to you?

choices	# of responses	% of responses
a) a severe thunderstorm is imminent or occurring	2320	86.7%
b) a severe thunderstorm is possible	357	13.3%

Results: The great majority (almost 93%) knew the definition of a watch. A smaller number, but still a large majority (just under 87%) knew the definition of a warning.

Conclusions: The above shows that we (National Weather Service) have succeeded in educating most of our listening audience to our severe weather terminology.

Recommendations: Continue to include the definition in each watch and warning, and broadcast weather terms and information over NOAA Weather Radio in times of fair weather.

#9) Which of the following weather elements are of the greatest importance to you? (mark in order from 1 to 4)

The following table shows our listeners responses:

	1	2	3	4
Precipitation	1263	798	333	111
Temperature	796	1073	452	185
Wind	279	421	1141	1107
Sky cover	164	216	568	1545

Results: Some odd numbers of answers are due to the fact that not everyone answered every question. Some people placed a check mark on their preferred choice. From the above table we can list the weather elements that are most important to our listeners.....

- 1) Precipitation
- 2) Temperature
- 3) Wind
- 4) Sky cover

Conclusions: The results substantiate the fact that precipitation (rain, sleet, snow, etc.) is much more important to people than temperature, wind, and sky cover. Of course, there will always be times when extreme heat/cold or very high winds will take precedent. Sky cover, to a much lesser extent, is an important factor. For example, a person renting a house at the beach for a week during the summer considers sunshine a must.

Recommendations: Forecasters, knowing the weather elements that affect people the most, should key their forecasts to these events. Instead of saying "cloudy and windy with rain", maybe just "rainy and windy" would suffice. The emphasis should definitely be put on the weather element that will affect the majority of the people.

The following 2 questions pertain to the listeners concept of the terms "tonight" and "this evening".

#10) When you hear the forecast for "tonight", which of the following most closely approximates your concept of tonight?

time period	# of responses	% of responses
a) sunset to sunrise	1124	42.0%
b) 8PM to 8AM	545	20.4%
c) 6PM to 6AM	726	27.1%
d) other	282	10.5%

Results: These statistics show that, in the minds of our listeners, there is no universal meaning to the term "tonight". Given the above choices the largest number of people thought that "tonight" was from sunset to sunrise. The length of this time period changes as our seasons change, and, is basically, the time without sunlight. Choices b) and c) are fixed time periods and include both daylight and non-daylight hours. Separately they received 20% and 27% not a large amount but still significant. Combined, their total of 47% exceeds the varying time period in a) by 5%.

#11) When you hear the forecast for "this evening", which of the following most closely approximates your concept of "this evening?"

time period	# of responses	% of responses
a) 4PM to 7PM	88	3.3%
b) 5PM to 8PM	511	19.1%
c) 6PM to 9PM	692	25.8%
d) 6PM to midnight	929	34.7%
e) a varying time period, depending on the season, usually 1 to 2 hours before and after sunset	422	15.8%
f) other	35	1.3%

Results: Listener response was once again spread throughout the options. The largest number of people thought that "this evening" referred to the time period from 6PM to midnight (35%). The second largest response was for the time period from 6PM to 9PM (26%). Next came 5PM to 8PM (19%) and then a varying time period, depending on the season, usually 1 to 2 hours before and after sunset (16%).

Conclusions: The results of both 10) and 11) show that the terms "tonight" and "this evening" will be interpreted differently depending on who is doing the interpreting. This, more than likely, pertains to other time period terms also. We, as forecasters, should be aware of the vagueness of all time period terms.

Recommendations: Forecasters should be particularly sensitive to weather occurring in the crossover hours evening/early nighttime, late night/pre-dawn, etc. Mention specific time periods whenever possible (until 9PM, until midnight, after 3AM, after sunrise, 11PM to 3AM, etc.).

#12) The phrase a 30% chance of rain today means:

choices	# of responses	% of responses
a) rain will occur 30% of the time today	68	2.5%
b) at any point in the area there is a 30% chance of rain today	2544	95.0%
c) 30% of the area will have rain today	65	2.4%

Results: A solid response to an important question. Most listeners (95%) know or think they know what probabilities mean when they are included in the forecast. This is a reassuring fact to forecasters.

Conclusions: What was not addressed in the questionnaire was the wording that coincides with the different probabilities. There would, undoubtedly, be very little agreement among our listening audience as far as our terminology (chance, likely, scattered, occasional, etc.) goes.

Recommendations: Forecasters should put a great deal of emphasis on conveying their meteorological thoughts to the public. The forecast should tell the public what is expected to happen, with limited restrictions pertaining to terminology, and should definitely include probabilities. Once again, the important fact here is that the large majority of our listeners do understand probabilities.

#13) Which of the following most closely approximates your concept of "near 55"?

temperature range	# of responses	% of responses
a) 53-55	516	19.3%
b) 53-57	1103	41.2%
c) 54-56	782	29.2%
d) 50-60	237	8.9%
e) other	39	1.5%

Results: There was no clear cut answer here, although the majority of the people (70%) used 55 as the center point and kept the temperature within 2 degrees either above or below. Here are several interesting aspects:

- 1) 9% of the respondees thought that "near 55" meant anything from 50 through 60 a very large range and an incorrect interpretation as far as forecasters go.
- 2) 19% thought that "near 55" meant 53 through 55. While this may not be gramatically correct, it may be the right answer, depending on the intent of the person writing the forecast. Many forecasters will include a number but not exceed that number when using the term "near". This brings us to our next question....

#14) In your opinion does "near 55" mean the same as "around 55"?

choices	# of responses	% of responses
a) yes	1988	74.3%
b) no	689	25.7%

Results: Most of the people who answered this question with a "no" thought that "near 55" meant 53 to 55 when the temperature was rising and 55 to 57 (or 57 to 55) when the temperature was falling. "Around 55" meant just that within 2 degrees either side of 55 degrees.

#16) Which of the following most closely approximates your concept of "mid 50s"?

temperature range	# of responses	% of responses
a) 52-58	193	7.2%
b) 53-57	1395	52.1%
c) 54-56	1060	39.6%
d) other	29	1.1%

Results: The response here shows that when listeners hear "mid 50s", 52% think 53 to 57. Another 40% think of a smaller range (54 to 56). It is quite obvious that our listening audience considers 52 and 58 to be outside the range of "mid 50s" a fact that most forecasters agree on also.

Conclusions: The terms "near" and "around" will be interpreted by about 3/4ths of our listeners to be identical, and, therefore, can be used interchangeably. Other temperature terms (lower, middle, upper, low to mid, etc.) will be interpreted differently by our listening audience.

Recommendations: The best way for forecasters to convey a temperature range to the public is to give specific beginning and ending points (53 to 57, 50 to 57, 57 to 59, 53 to 59, etc.). Another way is to educate our listeners to what we mean when we call for a particular temperature range (low 50s, mid 50s, upper 50s, etc.). For example, low 50s 50 to 53, mid 50s 53 to 57, upper 50s 57 to 59, etc. This can be accomplished by broadcasting messages over NOAA Weather Radio and by issuing special weather statements over our Weather Wire teletype networks. Unfortunately, the education process is very slow. Specific temperatures in the forecasts seem to be the way to go.

#17) In making decisions that are influenced by the occurrence of precipitation, what is the minimum chance that is likely to cause you to alter your plans?

precipitation probabilities	# of responses	% of responses
a) 30-40%	458	17.1%
b) 50-60%	1142	42.7%
c) 70-80%	829	31.0%
d) >80%	248	9.3%

Results: 17% of the respondees would change their plans if we have 30% or 40% probabilities mentioned. The figure rises to 43% for probabilities of 50% or 60%. Another 31% will alter their plans for 70% or 80% probabilities.

Conclusions: Most people (83%) will not alter their plans until our probabilities are 50% or higher. With a 60% probability in the forecast, we can assume that 60% of our listeners would change their plans, if those plans would be influenced by the occurrence of precipitation. With an 80% probability in the forecast, we can figure that 91% of our listeners would change their plans. This question pertains strictly to probabilities, not to the type of precipitation. The type of precipitation would, most likely, enter into a persons decision also, depending on the activity involved.

Recommendations: The National Weather Service should continue to include probabilities in forecasts. Listeners, for the most part, understand probabilities, and use them to alter plans if their planned activity is weather dependent.

#18) When you hear "snow flurries" in the forecast, what do you expect?

choices	# of responses	% of responses
a) brief, intense snowfall with periods of no snow. Some accumulation	193	7.2%
b) fall of snow with varying duration but no accumulation	2319	86.6%
c) continuous fall of snow but no accumulation	41	1.5%
d) other	124	4.6%

Results: As forecasters, we consider answer a) to be snow showers ...b) to be snow flurries....and c) to be light snow. The large majority of listeners (87%) agree that "snow flurries" is a fall of snow with varying duration but no accumulation. 7% of the respondees chose a). Some of these people may have moved here from areas where snow showers are much more predominant (but this is strictly conjecture).

Conclusions: The important factor regarding this question is that 87% of the respondees perceive "snow flurries" as a non-measurable event....light, intermittent, and with no accumulation. This is exactly what the forecaster in Philadelphia is intending to convey when using the term.

Recommendation: National Weather Service forecasters in Philadelphia should continue to use "snow flurries" in the forecast when applicable.

- #19) In your opinion, which of the following represent minimum criteria for a thunderstorm to be considered severe?
(more than one answer may apply)

parameter(s)	# of responses	% of responses
a) heavy rain and/or frequent lightning	2039	76.2%
b) winds strong enough to cause significant tree and/or structural damage	1754	65.5%
c) gusty winds of any speed	609	22.7%
d) hail that is dime-size or larger	573	21.4%
e) hail of any size	760	28.4%

Results: The answers to this question show us our listeners concept of a severe thunderstorm. More than 3/4ths of the people (76.2%) felt that all that was needed to classify a thunderstorm as severe was heavy rain and/or frequent lightning. This is an interesting response. If we were to use this criteria, the large majority of thunderstorms in this area would be considered severe. Most people evidently, do not consider the damage threat when hearing the terms thunderstorm/severe thunderstorm. In other words, to a majority of our listeners, any thunderstorm can be severe.

Almost 2/3rds of the respondees (65.5%) felt that "winds strong enough to cause significant tree and/or structural damage" was enough to classify the thunderstorm as severe. This is opposed to 22.7% saying that gusty winds of any speed would cause a thunderstorm to be considered severe. This is telling us that damage is the key factor to those who considered wind as one of their criteria.

Hail, to a much lesser extent, was the other factor in considering whether or not a thunderstorm was severe. Less than 1/2 of the respondees (d + e = 49.8%) thought that hail represented minimum criteria for a thunderstorm to be considered severe. The interesting point here is that the size of the hail did not seem to matter. More people (28.4%) thought that "hail of any size" would be enough to classify a thunderstorm as severe, as opposed to 21.4% who thought that the hail should be dime-size or larger.

Conclusions: From the above statistics we can then list our listeners priority criteria for classifying a thunderstorm "severe"

- 1) heavy rain and/or frequent lightning
- 2) strong gusty damaging winds
- 3) hail of any size

It is quite evident that a large number of our listeners have a concept of severe weather that is different than the National Weather Service definition of severe weather.

Recommendations: Broadcast our criteria for severe thunderstorms during times of fair weather in an effort to make our listeners aware of our criteria. Emphasize large hail (or give the diameter in inches) and damaging winds (or give mph) in statements, watches, and warnings. When a warning is issued, include the following in the call to action statement
"Remember, this is a severe storm with winds at or above 58 mph and/or hail equal to or greater than 3/4 inch diameter".
In special weather statements pertaining to thunderstorms, close with "Heavy rain and frequent lightning by themselves are not criteria for the National Weather Service to classify a thunderstorm as severe. But remember, any cloud to ground lightning can be dangerous".

#20) When you hear "partly sunny" in the forecast, what does it mean to you?

choices	# of responses	% of responses
a) less cloudiness than partly cloudy	727	27.2%
b) more cloudiness than partly cloudy	518	19.4%
c) a psychological concept in the mind of the forecaster to convey a positive atmosphere rather than negative partly cloudy and partly sunny mean basically the same amount of cloudiness	1424	53.2%

Results: The majority of respondees (53.2%) felt that partly cloudy and partly sunny meant virtually the same amount of cloudiness and that by saying "partly sunny", the forecaster was just trying to convey positive thoughts. The term "sunny" is much more positive than the term "cloudy". This can also be seen in the responses to a) ... 27.2% and b) ...19.4%. A larger number of people felt that "partly sunny" meant less cloudiness than partly cloudy rather than more cloudiness than partly cloudy. Less cloudiness means more sunshine, which, in the eyes of the public, means better weather (or a positive atmosphere rather than negative).

Conclusions: Most listeners thought that "partly sunny" meant either the same amount of cloudiness or less cloudiness than partly cloudy. The term "partly sunny" implies positive thoughts.

Recommendation: National Weather Service forecasters in Philadelphia should continue using "partly sunny" when trying to convey fair weather and positive thoughts to listeners.

#21) When you hear "considerable cloudiness" in the forecast, what does it mean to you?

choices	# of responses	% of responses
a) less cloudiness than mostly cloudy	594	22.2%
b) more cloudiness than mostly cloudy	1305	48.7%
c) the same amount of cloudiness as mostly cloudy	774	28.9%

Results: The largest response group (48.7%) thought that "considerable cloudiness" meant more cloudiness than mostly cloudy. This is interesting since the majority of the forecasters at the forecast office in Philadelphia think just the opposite when using the term.

Conclusions: Since our forecasts are written to be used by the public, we, as forecasters, should gear our terminology toward the public. If we can't convey to the public what we really want to say, than our effort will be in vain. "Considerable cloudiness" is very vague and easily misunderstood by our listeners.

Recommendation: Forecasters in Philadelphia should limit or restrict the use of "considerable cloudiness".

#22) When you hear "variable cloudiness" in the forecast, what does it mean to you?
(more than one answer may apply)

choices	# of responses	% of responses
a) the sky cover will go from clear to cloudy or from cloudy to clear, and remain that way	439	16.4%
b) clouds will cover the area in continually varying amounts	2069	77.3
c) the same as partly cloudy	309	11.5%
d) more clouds than sun	333	12.4%
e) more sun than clouds	78	2.9%

Results: The large majority of respondees (77.3%) thought that "variable cloudiness" meant that clouds will cover the area in continually varying amounts. This is basically what we, as forecasters mean when we use the term. It is interesting to see the responses to d) ... 12.4% and e) ... 2.9%. More than 4 times as many people thought that "variable cloudiness" meant more clouds than sun rather than more sun than clouds. This is probably the psychological aspect taking over once again the term "cloudiness" has a negative connotation, thus more clouds and less sun.

Conclusions: The term "variable cloudiness" is understood quite well by our listeners. "Varying amounts of clouds and sun" might say it better, but would be too lengthy for our purpose.

Recommendation: Forecasters in Philadelphia should continue using the term "variable cloudiness" when applicable.

#23) Following is a list of "sky cover" terms. Please put in numerical order (1-10) from best to worst in your opinion.

The following table shows our listeners responses:

	1	2	3	4	5	6	7	8	9	10
Sunny	1265	1110	62	12	13	15	13	10	14	26
Clear	1226	800	219	162	20	15	8	17	11	24
Mostly sunny	36	382	1704	153	47	44	42	38	27	14
Partly sunny	2	27	239	1500	227	147	126	80	98	39
Partly cloudy	10	19	35	249	818	738	411	107	68	29
Variable cloudiness	13	15	27	134	811	789	379	124	98	111
Increasing cloudiness	9	19	47	124	260	477	966	285	124	52
Considerable cloudiness	14	9	22	24	25	78	211	1036	598	448
Mostly cloudy	6	19	12	30	90	116	214	569	1168	262
Cloudy	12	82	128	41	65	81	117	244	302	1417

Results: From the above table we can list the "sky cover" terms that our listeners consider to be best to worst.

- 1) Sunny
- 2) Clear
- 3) Mostly sunny
- 4) Partly sunny
- 5) Partly cloudy
- 6) Variable cloudiness
- 7) Increasing cloudiness
- 8) Considerable cloudiness
- 9) Mostly cloudy
- 10) Cloudy

Some people thought that the question pertained to "their preference" on the weather. Some remarks were "this order, unless we need rain" "I like cloudy weather better than sunny weather" "best to worst what?". This is why 26 people put sunny and 24 people put clear as their #10 choice.

Conclusions: The results substantiate the "best to worst" and the "positive to negative" aspect of the "sky cover" terms. The public seems to perceive these terms almost identical to the way the forecaster uses them.

One question does arise in #21 the largest response group thought that "considerable cloudiness" meant more cloudiness than mostly cloudy. This being the case, why did "considerable cloudiness" come in ahead of "mostly cloudy" on our list? Any answer to this question would be pure speculation at this time. It once again points out the vagueness of the term "considerable cloudiness".

Recommendations: Forecasters should continue to use the terms, with the possible exception of "considerable cloudiness", when applicable.

#24) When a "Winter Storm Warning" is in effect, what conditions would you expect?
(more than one answer may apply)

parameter	# of responses	% of responses
a) snow amounts of 2 inches or more	571	21.3%
b) snow amounts of 4 inches or more	1333	49.8%
c) snow amounts of 6 inches or more	773	28.9%
d) a large buildup of ice from freezing rain	1213	45.3%
e) temperature at or below 20 deg	903	33.7%
f) wind speeds in excess of 20 mph	1313	49.0%

Results: Snow is the main weather parameter for our area in winter storms. 21.3% of the respondees thought that snow of 2 inches or more would constitute a "Winter Storm". 49.8% thought 4 inches or more, and another 28.9% thought 6 inches or more. 4 inches or more in a 12-hour period is the National Weather Service criteria for this area. The 571 people who thought that 2 inches or more constituted a "Winter Storm" may be largely from groups that are affected by relatively small amounts of snow senior citizens, handicapped, etc. The 773 people who thought that 6 inches or more was the criteria may be winter sports enthusiasts or people who have moved into our area from an area where the National Weather Service criteria for 12-hour snowfall was 6 inches or more. The above two statements are strictly conjecture at this time.

Another interesting aspect was the response to f), where 49% said that they would expect wind speeds in excess of 20 mph in a winter storm. Our major winter storms (for the most part) are "Northeasters". These storms develop along the south or mid Atlantic coasts and intensify as they move north. They normally produce large snowfalls and are frequently accompanied by high winds.

45.3% of the respondees thought that winter storms could be accompanied by a large buildup of ice from freezing rain. This situation occurs quite often in our area. Cold air gets entrenched at the surface a storm moving up the east coast feeds off the relatively warm waters of the Atlantic and draws mild air into its circulation. This will cause snow to change to freezing rain over portions of southern New Jersey and Southeastern Pennsylvania (depending on the exact track of the system).

Only 1/3rd of the people (33.7%) thought that temperatures at or below 20 degrees would accompany a winter storm. Even this is a high percentage since most of our storms occur with temperatures between 20 and 35 degrees F. There, of course, is the rare occurrence but this would happen less than 5% of the time.

Conclusions: Our listeners believe that winter storms will be accompanied by one or more of the following:

- snow or sleet
- freezing rain
- wind
- cold temperatures (to a lesser extent)

They do not necessarily know the National Weather Service criteria for issuing a "Winter Storm Warning".

Recommendations: We should broadcast over NOAA Weather Radio our criteria for issuing a "Winter Storm Warning" during times of fair weather in an effort to make our listeners aware of our criteria. Forecasters should continue to make reference in special weather statements to the specific winter weather parameters that will be affecting the area. All special weather statements pertaining to winter weather should close with the watch/warning criteria definitions.

Summary.....

The survey was extremely informative but ended up being a monumental project. The number of man-hours involved was enormous. My thanks to everyone who helped with the mailing and the assimilation of data. Special thanks to Dave and Barbara Wert, who spent many long hours on the project.

The response to the survey shows that, in the Philadelphia metropolitan area, NOAA Weather Radio has a large listening audience and plays a major role in the dissemination of the National Weather Service forecast. If we use a "normal" 1 to 10 ratio of responses to the total audience, then we can assume that we have over 26,000 listeners. Unfortunately, there is no way for us to know if this ratio is appropriate in this case. With current and additional promotional activities, our listening audience should continue to grow and become an even more important factor in the weather community.